

REMARKS

Claims 1-3, 5-10, 12 and 13 are all the claims pending in the application.

I. Claim Rejections under 35 U.S.C. § 103(a)

A. The Examiner has rejected claims 1, 2, 5-9, 12 and 13 under 35 U.S.C. §103(a) as being unpatentable over Baldwin, Jr. et al. (U.S. 6,280,563) in view of Tobe et al. (U.S. 5,891,349). Applicants respectfully traverse this rejection on the following basis.

Claim 1 recites the feature of a plasma source having a power source operable to apply a high frequency power to the coil or antenna, wherein the power source comprises a first power supply operable to supply a first power with a first frequency (f1) and a second power supply operable to supply a second power with a second frequency (f2), wherein the second frequency (f2) is less than one tenth of the first frequency (f1). Applicants respectfully submit that the combination of Baldwin and Tobe fails to disclose or suggest at least this feature of claim 1.

Regarding Baldwin, Applicants note that this reference discloses a vacuum plasma processor 10 which includes a vacuum chamber 12 for holding a workpiece 11 therein, an RF excitation source 40, and a DC or RF source 48 (see Fig. 1). In the Office Action, the Examiner recognizes that while Baldwin discloses the use of a first RF source 40 and a second RF source 48, that Baldwin does not disclose or suggest that each of these sources supplies a different frequency such that the frequency supplied by one of the sources is less than one tenth of the frequency supplied by the other source.

In an attempt to cure this deficiency of Baldwin, the Examiner has applied the Tobe reference and asserts that based on the disclosure in Tobe, that one of ordinary skill in the art would have been motivated to construct the first RF source 40 and the second RF source 48 of Baldwin such that one of these power sources supplies a frequency that is less than one tenth of the frequency supplied by the other power source. Applicants respectfully disagree.

In particular, regarding Tobe, Applicants note that this reference discloses a plasma processing apparatus having a single RF power source that 52 that supplies high frequency power to a coil 61 (see Fig. 1). In Tobe, it is disclosed that the frequency to be utilized for the single RF

power source 52 can be a frequency selected from within the range of 10 kHz to 1,000 MHz (see col. 9, lines 17-19).

Thus, while Tobe discloses that the frequency for a single RF power source can be chosen from somewhere within a given range of frequencies, Applicants respectfully submit that Tobe includes absolutely no suggestion that two RF power sources should supply different frequencies such that the frequency supplied by one of the power sources is less than one tenth of the frequency supplied by the other power source. Instead, as noted above, Tobe merely discloses that the frequency of a single RF power source can be chosen from somewhere within a given range of frequencies.

In view of the foregoing, Applicants respectfully submit that the combination of Baldwin and Tobe would not render obvious the feature of a power source that comprises a first power supply operable to supply a first power with a first frequency (f1) and a second power supply operable to supply a second power with a second frequency (f2), wherein the second frequency (f2) is less than one tenth of the first frequency (f1), as recited in claim 1. Accordingly, Applicants respectfully submit that claim 1 is patentable over the cited prior art, an indication of which is kindly requested.

Moreover, regarding the above-noted feature of the second frequency being less than one tenth of the first frequency, Applicants note that the Examiner has indicated in the Office Action that this feature is a method limitation which does not further limit the claim. Applicants respectfully disagree.

Initially, Applicants note that a method limitation would include an active step (e.g., “supplying a first power with a first frequency”), and that such an active step is clearly not recited in claim 1. Thus, as the feature of “wherein the second frequency (f2) of the second power is less than one tenth of the first frequency (f1) of the first power” is not drafted as an active step of performing a certain function, Applicants submit this feature is clearly not a method limitation.

Moreover, even if the Examiner characterizes the limitation of “wherein the power source comprises a first power supply operable to supply a first power with a first frequency (f1) and a second power supply operable to supply a second power source with a second frequency (f2), wherein the second frequency (f2) of the second power is less than one tenth of the first

frequency (f1) of the first power” as a functional limitation, Applicants note that the MPEP makes it abundantly clear that apparatus claims may be described in functional terms.

In particular, as set forth in MPEP §2173.05(g), it is explained that a “functional limitation must be evaluated and considered, just like any other limitation of the claim, for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which it is used” (emphasis added).

In view of the foregoing, Applicants respectfully submit that the above-noted feature of the second frequency being less than one tenth of the first frequency must be evaluated and considered on the merits just like any other limitation of the claim. Further, as discussed above, Applicants respectfully submit that the combination of Baldwin and Tobe would not in any way suggest to one of ordinary skill in the art that the frequency of the two power sources in Baldwin should function in such a manner. Accordingly, Applicants submit claim 1 is patentable over the cited prior art, an indication of which is kindly requested.

In addition, Applicants note that claim 1 also recites that an impedance of the coil or antenna with respect to the first power with the first frequency is at least two times more than an impedance of the capacitor coupled to the coil or antenna, and that an impedance of the coil or antenna with respect to the second power with the second frequency is less than one fifth of the impedance of the capacitor coupled to the coil or antenna. Regarding these limitations, Applicants note that the Examiner has taken the position that such features are method limitations which do not further define the claim. Applicants respectfully disagree.

As discussed above, Applicants note that a method limitation would include an active step, and that the above-noted features drawn to the impedances are clearly not drafted in such a manner. Instead, Applicants submit that the above-noted features drawn to the impedances further define the elements of the claimed apparatus by characterizing the elements recited in the claim in terms of “impedance”.

Accordingly, as the above-noted features merely characterize the elements recited in the claim, Applicants respectfully submit that such features must be given patentable weight. In this

regard, Applicants submit that the combination of Baldwin and Tobe clearly does not disclose, suggest or otherwise render obvious such features.

Further, regarding the above-noted features drawn to the relationship between the frequencies and the impedances, Applicants note that the Examiner indicates in the Office Action that the apparatus of Baldwin and Tobe would be capable of producing the claimed relative frequencies and impedances. Applicants respectfully submit, however, this statement is not sufficient for establishing obviousness under 35 U.S.C. § 103(a).

In particular, as explained in MPEP § 2143.01(III), the “fact that references can be ... modified is not sufficient to establish prima facie obviousness” (emphasis added). Instead, the MPEP makes it clear that the prior art must suggest the desirability of the claimed invention (see MPEP § 2143.01(I)). Accordingly, the MPEP clearly requires that the Examiner explain why one of ordinary skill in the art would have been motivated to provide an apparatus having the claimed relative frequencies and impedances as set forth in claim 1.

In other words, the mere indication that the plasma processing apparatus of Baldwin could be provided with the claimed relative frequencies and impedances is not the proper standard for determining obviousness. Instead, the Examiner must identify a specific reason as to why one of ordinary skill in the art, with no knowledge of the claimed invention, would modify the plasma processing apparatus of Baldwin so as to have the relative frequencies and impedances as specifically set forth in claim 1.

In this regard, Applicants respectfully submit that there is simply no evidence of a teaching or suggestion in either Baldwin or Tobe that would have led one of ordinary skill in the art to provide the plasma processing apparatus of Baldwin with the relative frequencies and impedances as recited in claim 1. Accordingly, Applicants submit that claim 1 is patentable over the combination of Baldwin and Tobe, an indication of which is kindly requested.

Claims 2 and 5-7 depend from claim 1 and are therefore considered patentable at least by virtue of their dependency.

Regarding claim 8, Applicants note that this claim recites the same features as discussed above with respect to claim 1. In particular, claim 8 recites the features of a first power supply operable to supply a first power with a first frequency (f1) and a second power supply operable to

supply a second power with a second frequency (f_2), wherein the second frequency (f_2) is less than one tenth of the first frequency (f_1), wherein an impedance of the coil or antenna with respect to the first power with the first frequency (f_1) is at least two times more than an impedance of a capacitor coupled to the coil or antenna, and wherein an impedance of the coil or antenna with respect to the second power with the second frequency (f_2) is less than one fifth of the impedance of the capacitor coupled to the coil or antenna.

Accordingly, for at least the same reasons as discussed above with respect to claim 1, Applicants respectfully submit that the combination of Baldwin and Tobe fails to disclose, suggest or otherwise render obvious such features. Accordingly, Applicants submit that claim 8 is patentable over the cited prior art, an indication of which is kindly requested.

Claims 9, 12 and 13 depend from claim 8 and are therefore considered patentable at least by virtue of their dependency.

B. The Examiner has rejected claims 1-3, 5-10, 12 and 13 under 35 U.S.C. § 103(a) as being unpatentable over Maeda et al. (U.S. 6,624,084) in view of Baldwin, Jr. et al. and Tobe et al.

As discussed above, claims 1 and 8 recite the features of a first power supply operable to supply a first power with a first frequency (f_1) and a second power supply operable to supply a second power with a second frequency (f_2), wherein the second frequency (f_2) is less than one tenth of the first frequency (f_1), wherein an impedance of the coil or antenna with respect to the first power with the first frequency (f_1) is at least two times more than an impedance of a capacitor coupled to the coil or antenna, and wherein an impedance of the coil or antenna with respect to the second power with the second frequency (f_2) is less than one fifth of the impedance of the capacitor coupled to the coil or antenna.

For at least the same reasons as discussed above, Applicants respectfully submit that the combination of Baldwin and Tobe does not disclose, suggest or otherwise render obvious such features. Further, Applicants respectfully submit that Maeda fails to cure these deficiencies of Baldwin and Tobe.

For example, Applicants note that while Maeda discloses a plasma processing apparatus that includes a vacuum processing chamber 1 for holding a wafer 3 therein, a plasma source 11, an antenna 7, a gas diffusing plate 8, and a dielectric member 9 (see Fig. 3 and col. 8, lines 46-53), that Maeda does not in any way disclose or suggest the above-noted features recited in claims 1 and 8.

In view of the foregoing, Applicants respectfully submit that combination of Maeda, Baldwin and Tobe does not disclose, suggest or otherwise render obvious all of the features recited in claims 1 and 8. Accordingly, Applicants submit that claims 1 and 8 are patentable over the cited prior art, an indication of which is kindly requested.

Claims 2, 3 and 5-7 depend from claim 1, and claims 9, 10, 12 and 13 depend from claim 8. Accordingly, Applicants respectfully submit that these claims are patentable at least by virtue of their dependency.

II. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may best be resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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